IN THE SPECIFICATION:

At page 1, prior to line 1, please insert a new heading and text as follows:

--CROSS-REFERENCE TO RELATED APPLICATION

Priority is claimed under 35 U.S.C. § 119 from Japanese application 2002-329150 filed November 13, 2002.--

The paragraph beginning at page 1, line 6 has been amended as follows:

--Such a magnetron includes, as shown in Fig. 7, a number of vanes 12 mounted radially on the inner wall of a cylindrical anode shell 11 with a cavity provided between any two adjacent vanes and the anode shell 11 and connected alternatively by straps 14 for stabilizing the oscillation in a π mode which all constitute an anode 1. As a cathode 2 is located at the center of the anode 1, the anode shell 11 has pole pieces 3 mounted to both axial ends thereof for applying a magnetic field substantially in parallel to the surface of the cathode 2 across an interaction space 4 between the inner side (at the inner end of the vanes 12) of the anode 1 and the outer side of the cathode 2. This causes electrons from the cathode 2 to be swirled by the right-angle force of the magnetic field in the interaction space 4 thus introducing energy to the resonant cavities for oscillation. The magnetron is commonly used in a radar system and energized with an anode voltage for pulsing operation.--

The paragraph beginning at page 1, line 20 and ending at page 2, line 9 has been amended as follows:

--~~Recent~~ In recent years, as a variety of microwave generators have been in use, their generating spurious radiation is strictly controlled under relevant regulations. It is also a drawback of the pulse magnetron to develop spurious radiation at frequencies close to the fundamental oscillation frequency. When

the magnetron used in a radar system is pulsed, its oscillation output has a number of other lobes at sidebands in addition to the main lobe in the spectrum shown in Fig. 8. The spectrum is determined by the pulse width provided for actuating the pulse magnetron ~~as~~ is not narrower than a spectrum of a Fourier analysis based on a oscillating output waveform. Inversely in general, the spectrum may be wider than its theoretical size due to various causes. Also, the shape of the spectrum is not linearly symmetrical about the fundamental oscillation frequency but may be biased as having a noticeable lobe profile (P) at one sideband, shown in Fig. 8, which causes spurious radiation.--

The paragraph beginning at page 2, line 10 has been amended as follows:

--One of the causes for creating faults in <u>the</u> spectrum such as <u>an</u> unsymmetrical shape or <u>a</u> noticeable lobe at the sideband may be oscillation off the predetermined operating timing at the rise in the pulse magnetron. When the anode voltage is gradually increased, the oscillation of the pulse magnetron will start at a current about 5 to 10 % lower than its rated level. The output is thus 40 to 50 dB lower than the rated level as the oscillation is made at a frequency lower than the fundamental oscillation frequency. Since the pulse magnetron having the above described operating characteristics is pulsed, it is timed at such a lower current range with each pulse rise in the lower side of the fundamental frequency and its output is 40 to 50 dB lower than the rated level. As the result, the frequency spectrum will be unsymmetrical having a noticeable profile of -40 to -50 dBc at one sideband.--

The paragraph beginning at page 3, line 17 has been amended as follows:

--When the vanes are arranged with ~~its~~ <u>their</u> axial ends

projecting for compensating for a non-uniformity of the magnetic field across the interaction space, the distance between the anode and the cathode becomes smaller but the drawback that the oscillation starts at a current lower than the rated level will hardly be eliminated. As the spurious radiation incitingly occurs at lower currents, unwanted oscillation at the rise of pulse will hardly be attenuated.--

The paragraph beginning at page 5, line 9 has been amended as follows:

--The construction of the pulse magnetron allows the distance between the cathode and the anode at the axial ends of the cathode (the vanes) where the magnetic flux density is maximum to be determined from the minimum of the magnetic flux density along the height of the vanes in the axial direction of the cathode in the interaction space. Also, the inner diameter of the anode and/or the outer diameter of the cathode are adjusted so that the distance between the anode and the cathode increases corresponding to the magnetic flux density which is decreased towards the center of the cathode. As the result, the pulse magnetron can be increased in the impedance thus minimizing the generation of unwanted oscillation at an anode voltage lower than its rated level. When the anode voltage of pulse form is applied, the oscillation starts with the rated level at each pulse in the π mode and its output spectrum can favorably be symmetrical to the main lobe. More particularly, the pulse magnetron can have characteristics close to their theoretical measurements while not exhibiting ~~no~~ an unwanted frequency profile.--

The paragraph beginning at page 5, line 27 and ending at page 6, line 2 has been amended as follows:

--Fig. 1(a) is a schematic view showing the longitudinal

cross section and Fig. 1(b) the transverse cross section of a magnetron of one embodiment of the present invention;--

The paragraph beginning at page 6, line 3 has been amended as follows:

--Fig. 2 is a diagram showing the equivalent magnetic flux density adjacent to the interaction space in the magnetron shown in Fig. 1(a) and Fig. 1(b);--

The paragraph beginning at page 6, line 6 has been amended as follows:

--Fig. 3 is a spectrum diagram of the oscillation output of the magnetron having a construction shown in Fig. 1(a) and Fig. 1(b);--

The paragraph beginning at page 6, line 10 has been amended as follows:

--Fig. 5 is a diagram showing a comparison in the anode current waveform between the pulse magnetron of the embodiment of the present invention and a conventional pulse magnetron;--

The paragraph beginning at page 6, line 21 and ending at page 7, line 3 has been amended as follows:

--A pulse magnetron according to the present invention will be described in mode detail referring to the relevant drawings. ~~The~~ A pulse magnetron according to the present invention ~~has~~ may have a construction shown in the cross sectional view of Fig. 1(a) and Fig. 1(b), for example. More specifically, a number of vanes 12 are radially mounted on the inner wall of a cylindrical anode shell 11 thus constituting an anode 1. As a cathode 2 is provided at the center of the anode 1, a pair of pole pieces 3 are mounted to both axial ends of the anode shell 11 for applying a magnetic field substantially in parallel to the cathode 2

across the interaction space 4 between the inner ends of the vanes 12 and the outer side of the cathode 2. The height of the vanes defines the height of the interaction space in the axial direction of the cathode.--

The paragraph beginning at page 7, line 4 has been amended as follows:

--According to the present invention, the radius r_a of an inscribed circle defined by the inner ends of the vanes 12 (refer to Fig. 4) and the radius r_c of the cathode 2 (refer to Fig. 4) where the magnetic flux density is maximum along the axial direction of the cathode 2 and the height of the vanes 12 in the interaction space 4 are determined to satisfy the foregoing equation (1). Also, the anode 1 and the cathode 2 are modified so that the anode radius r_a is increased or the cathode radius r_c is decreased when the magnetic flux density is low at the center of the vanes 12 or the anode radius r_a is increased and the cathode radius r_c is decreased, i.e., the distance between the outer surface of the cathode and the inner ends of the vanes is increased towards the center of the height of the vanes, i.e., towards the center of the interaction space in the axial direction of the cathode.--

The paragraph beginning at page 7, line 14 has been amended as follows:

--The anode 1 has, as shown in the longitudinal cross sectional view of Fig. ~~1A~~ 1(a) and the transverse cross sectional view of Fig. ~~1B~~ 1(b), its anode shell 11 made of non-oxygen copper or the like and joined at the inner wall to the outer ends of the (anode) vanes 12 which are also made of non-oxygen copper or the like. The vanes 12 extend at the other or inner end towards the center of the anode shell 11 and are spaced from each other by the cavity 13 for resonant oscillation at desired

frequencies, i.e., the vanes forming a plurality of cavity resonators. The vanes 12 are alternately connected by the straps 14 to vary the π radian phase for ease of the oscillation in the π mode. The anode 1 may be modified with its anode shell 11 not joined to but formed integral with the vanes 12 by providing slots or cavities.--

The paragraph beginning at page 8, line 11 and ending at page 9, line 2 has been amended as follows:

--The embodiment shown in Fig. 1 permits the radius of the cathode 2 to be smaller at the center than at the axial ends, then providing a concave form in the longitudinal cross section. More particularly, as shown in Fig. 4, the radius r_c at the axial ends of the cathode 2 is determined with the radius r_a at the inner side of the anode 1 (the inscribed circle defined by the inner ends of the vanes 12) and the magnetic flux b in the interaction space 4 to satisfy the foregoing equation (1). As the radius r_c' at the center of the cathode 2 is smaller than the radius r_c at the axial ends, the cathode 2 is distanced more at the center than at the axial ends from the inner ends of the vanes 12. The magnetic flux b in the equation (1) is defined as the maximum of the magnetic flux B in the interaction space by the magnetron operation theory, "The basic of microwave technology" by Makimoto et al, Hirokawa Shoten, 1980, twelfth edition, p. 278, formula ~~10.28)~~ 10.28. The radius r_a of the anode and the radius r_c of the cathode in the equation (1) are determined so that the magnetic flux is maximum along the vanes in the axial direction of the anode. This permits an offset from the theoretical operation to increase of the distance between the cathode and the anode.--

The paragraph beginning at page 9, line 3 has been amended as follows:

--More particularly, the radius r_c' at the center in the axial direction of the cathode 2 is set with r_c'/r_a smaller by 9.1 % than r_c/r_a (r_c'/r_c being 90.9 % or more). This is explained below. As shown with the equivalent magnetic flux density profile in Fig. 2, the magnetic flux at the center of the cathode 2 in the interaction space 4 in the magnetron of Fig. 1 is equal to 88 % of that at the axial ends. When the radius at the center of the cathode 2 is equal to <u>that</u> at the axial ends, the magnetic flux becomes smaller at the center thus allowing the operation to start at a lower level of the anode voltage. More particularly, the oscillation starts at the center in the axial direction when the pulsed anode voltage is increased. Accordingly, the generation of spurious radiation will occur at lower frequencies than the fundament oscillation frequency at the rise of each pulse signal.--

The paragraph beginning at page 10, line 1 has been amended as follows:

--The pulse magnetron according to the present invention shown in Fig. 1 however has the cathode 2 arranged smaller in the radius at the center in the axial direction than at the axial ends; r_c'/r_a at the center being smaller by 9.1 % than r_c/r_a at the axial ends. This permits the oscillation not to start before the anode voltage reaches a specific level. When the anode voltage reaches its specific level, the oscillation starts simultaneously at both the center and the axial ends along the axial direction of the vanes 2. As ~~the~~ <u>a</u> result, the pulse magnetron is inhibited from oscillating at lower frequencies than the fundamental oscillation frequency and its output spectrum can be improved in the profile.--

The paragraph beginning at page 10, line 12 and ending at page 11, line 4 has been amended as follows:

--Fig. 5 illustrates in comparison ~~in~~ the anode current waveform between the pulse magnetron of the present invention and a conventional pulse magnetron. The anode current and the anode voltage are plotted along the time base (the horizontal axis) in Fig. 5. In the conventional pulse magnetron, before the anode voltage pulsed up reaches its rated level, the anode current starts running because the magnetic flux density at the center in the axial direction of the cathode, as predetermined theoretically, remains low. This triggers oscillation at ~~lower~~ frequencies lower than the fundamental oscillation frequency. The pulse magnetron of the present invention has ~~the~~ an increasing distance arranged between the anode and the cathode ~~arranged increased~~ toward the center of the interaction space thus providing a higher level of transit impedance at the beginning of the rise of the anode voltage and allowing no current to flow. When the anode voltage reaches its rated level, the anode current starts running at once throughout the whole vanes. For example, the anode current in the pulse magnetron of the present invention rises up at 0.15 to 0.2 A/ns while that of the conventional magnetron is as low as 0.08 to 0.1 A/ns. As the pulse magnetron of the present invention is dynamically varied in the transient impedance, its anode current rises up sharply within an instant thus eliminating unwanted oscillation.--

The paragraph beginning at page 13, line 11 has been amended as follows:

--Furthermore, while either the anode or the cathode is modified in the previous arrangement, both the ~~abode~~ anode and the cathode may be arranged of desired shapes without increasing the degree of modification.--

The paragraph beginning at page 13, line 15 has been amended as follows:

--As set forth above, the present invention can successfully minimize any unwanted oscillation at the rise and decay periods of each pulse. More specifically, the pulse magnetron according to the present invention allows the oscillation in the π mode to start stably at the beginning of the rise of each pulse of the anode voltage and stop instantly upon the decay of the pulse. This suppresses the generation of spurious radiation. Accordingly, when used in a radar system, the pulse magnetron of the present invention ~~can permit no~~ avoids the need to use ~~of~~ a filter which ~~declines~~ could reduce the space saving and ~~increases~~ increase the overall weight, thus contributing to the reduction of the cost, the size, and the weight of the radar system.--